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DESIGN OF AN EASY-TO-USE MOBILE AUGMENTED REALITY LEARNING SETTINGBY MEANS OF A CONJECTURE MAP

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Luca Moser
luca.moser@unisg.ch
University of St.Gallen
Switzerland

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Overview

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Basic Assumptions | Research Gap and Goals

2 **Method**
Educational Design Research | Conjecture Mapping

3 **Results**
Design Principles| Conjecture Map | Learning Design

4 **Further Work and Discussion**
MARLS | Closing the Gap | …

Background and Goals| Basic Assumptions

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Why Focus on MAR ?

1) Augmented Reality may improve learning settings and make learning more effective (Bacca et al., 2014; Radu, 2012)
2) MAR is cost-efficient because mobile devices are widely available with students on upper secondary level (Akçayır and Akçayır, 2017)

Further Assumptions

3) To use MAR and design effective MARLS in classrooms is challenging and teachers often lack the necessary media-didactical skills (Bucher et al., 2020; Cuendet et al., 2013; Fraillon et al., 2019)
4) Despite the potential scalability and the considerable positive effects, MAR-tools are not regularly used in classrooms (Wang et al., 2018)

AR: Augmented Reality MAR: Mobile Augmented Reality MARLS: MAR Learning Setting

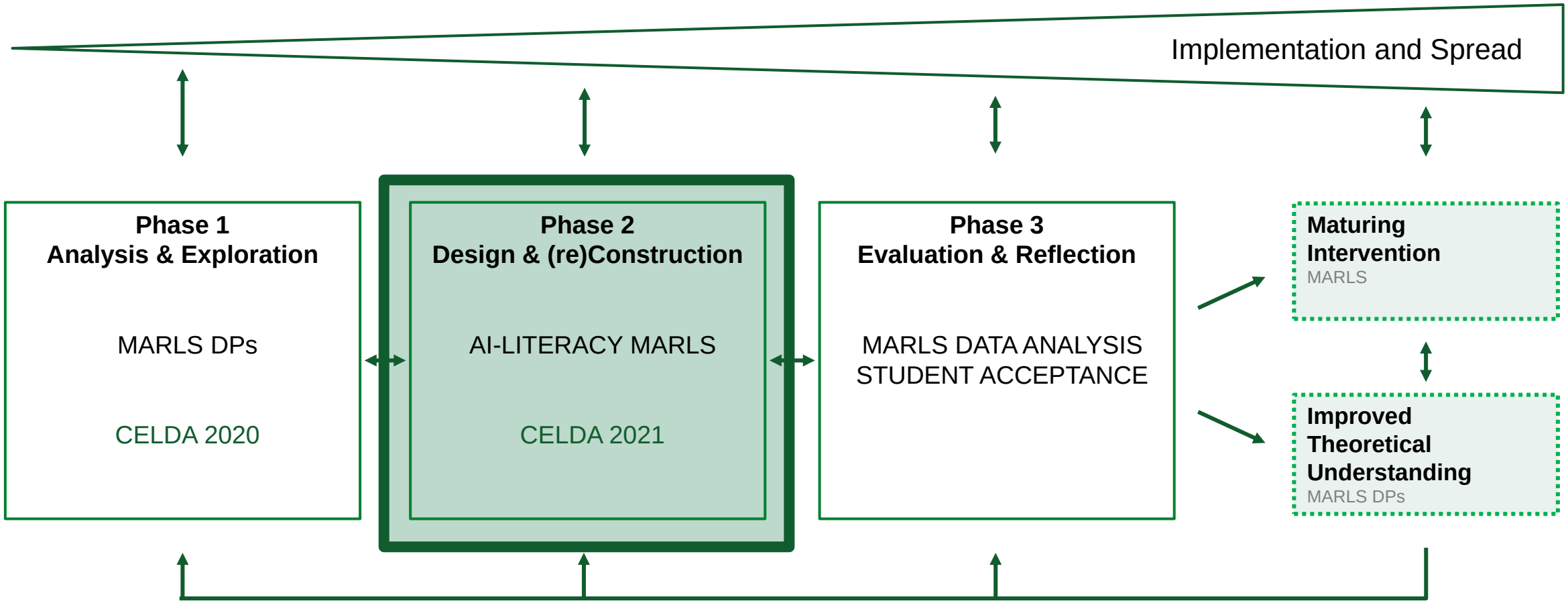
Background and Goal| Research Gap and Goals

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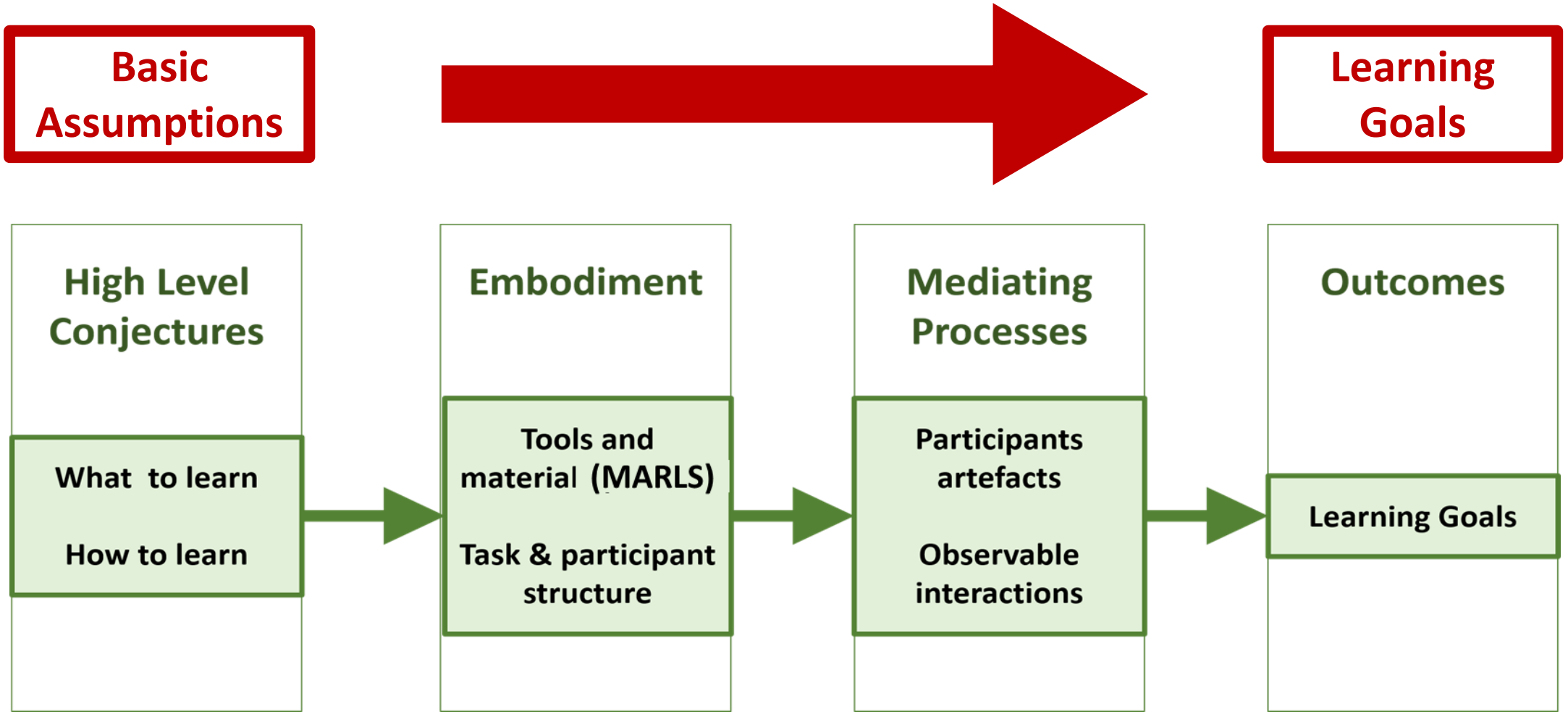
Theoretical Baseline	– Review on MAR in education (Moser, 2020) – Review on AI-literacy (Long and Magerko, 2020)
Relevance	– Practice: Teachers often feel insecure when developing and applying digitally enhanced learning settings (Fraillon et al., 2019) – Academia: Lack of concepts and data to guide the practical application of MAR-tools (especially on upper secondary level) (Kerr and Lawson, 2020; Kourouthanassis et al., 2015)
Main Goals	1) Development of a MARLS that enables teachers to foster AI-literacy 2) Improve design principles on the effective design of easy-to-use MARLS

AR: Augmented Reality MAR: Mobile Augmented Reality MARLS: MAR Learning Setting

Method| Educational Design Research (McKenney and Reeves, 2014)



Method| Conjecture Mapping (Sandoval, 2014; Wozniak, 2015)



Results| Design Principles

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MARLS Design Principles

Usability (techn.)
- easy and appealing to use for teachers and students (Cuendet et al., 2013)
- interface containing only relevant information and functions (Ko et al., 2013)

User/learner centeredness (pedag.)
- focus on the needs and requirements of the targeted learners (Stefan and Moldoveanu, 2013)
- easy classroom management and efficient use of the scarce learning time (Cuendet et al., 2013)
- motivational design and a context relevant to the learners (Dunleavy, 2014; Kerr and Lawson, 2020)

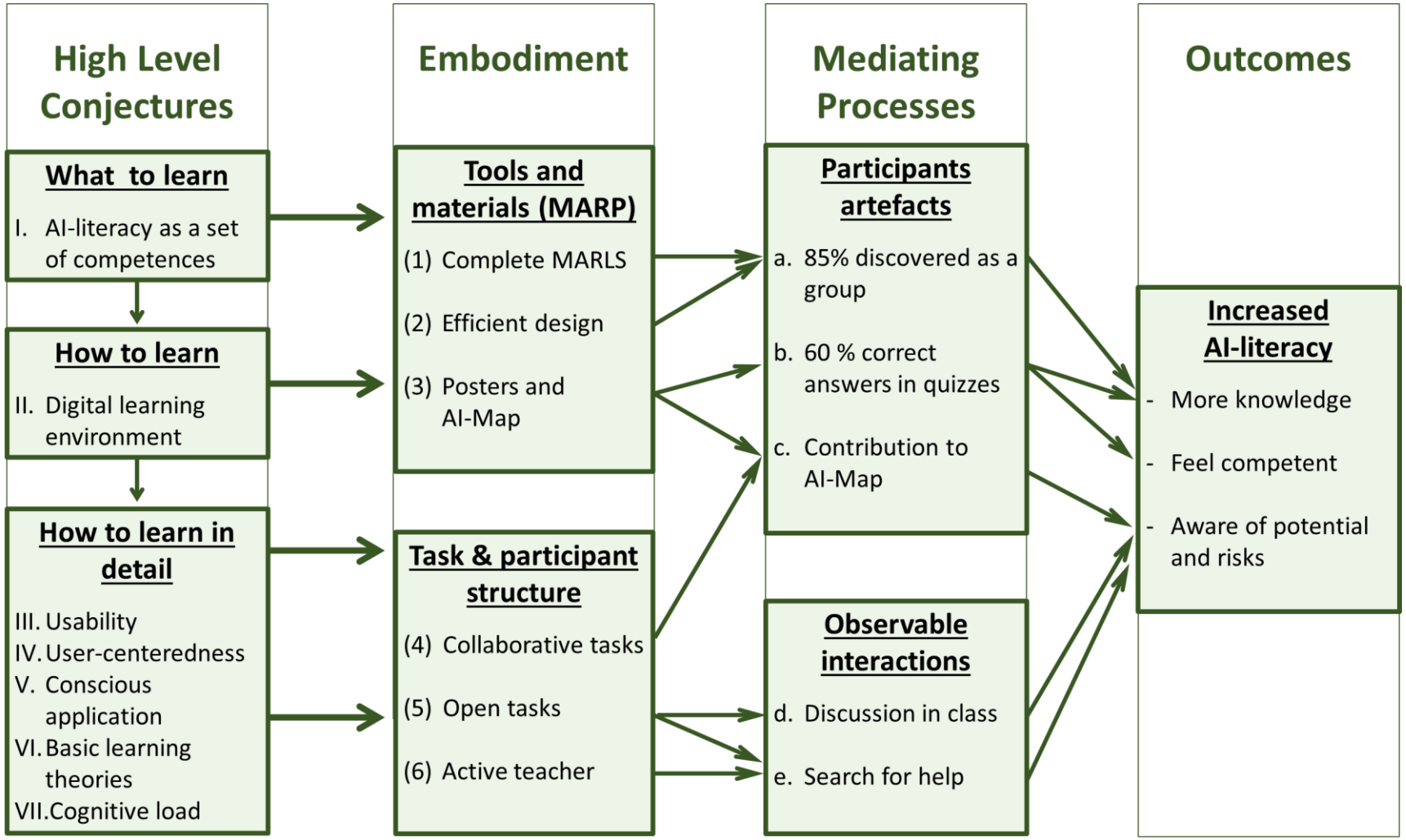
Basic learning theories
- classical learning theories still apply for MARLS (Messuti et al., 2015)
- create motivational and learner-centered MARLS (Bucher et al., 2020)

Conscious application of MAR
- organize and scaffold the activities to use the learning time effectively (Stefan and Moldoveanu, 2013)
- restrict MAR use to the activities where it supports the learning process effectively (Tuli and Mantri, 2020)

Cognitive (over)load
- special attention to the cognitive load of students (Garzón et al., 2019) and teachers (Cuendet et al., 2013)

→ Design for students AND teachers

Conjecture Map



AI-MARLS| The Learning Setting

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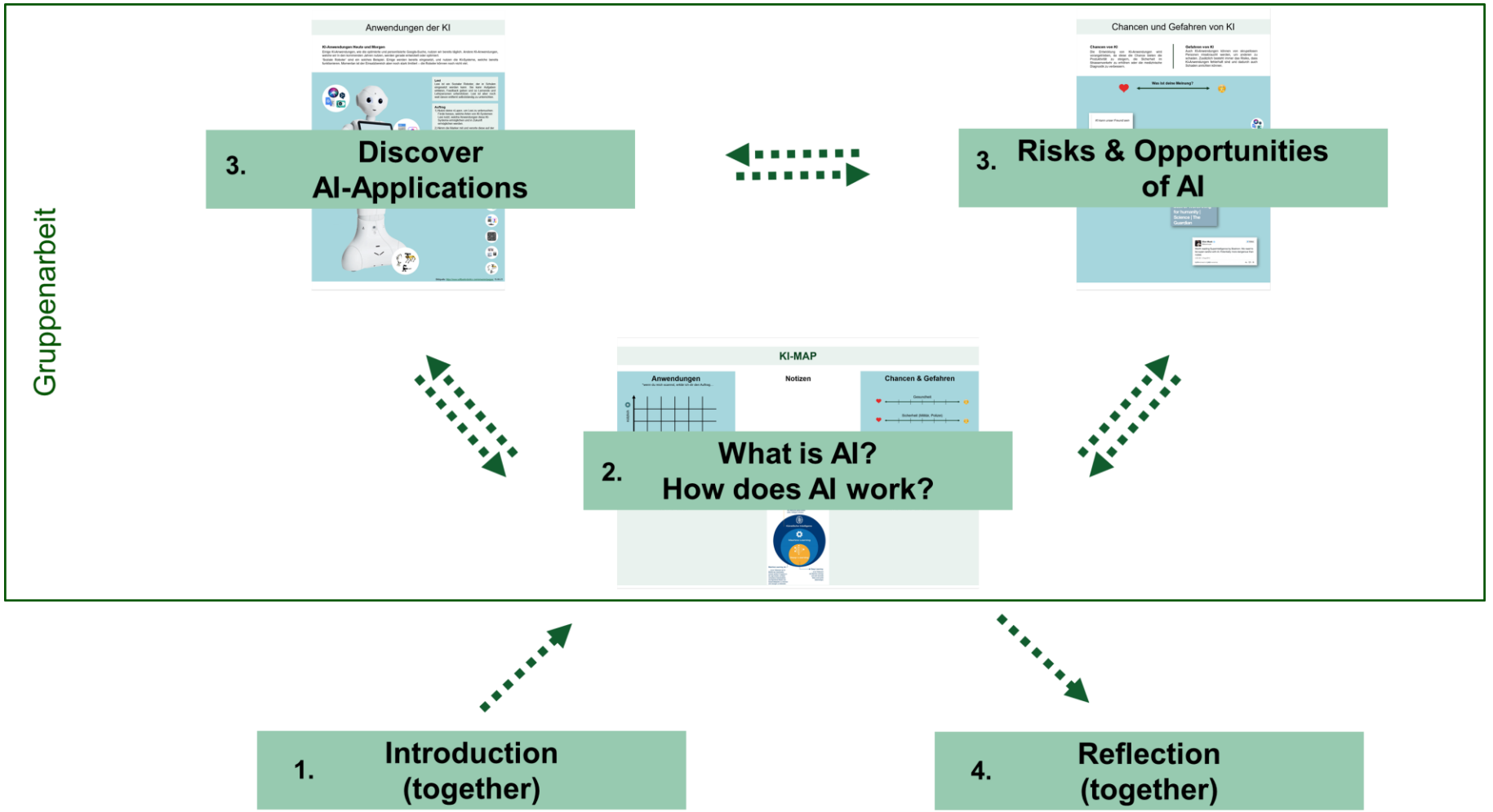
Upper Secondary

Swiss Vocational Gymnasium

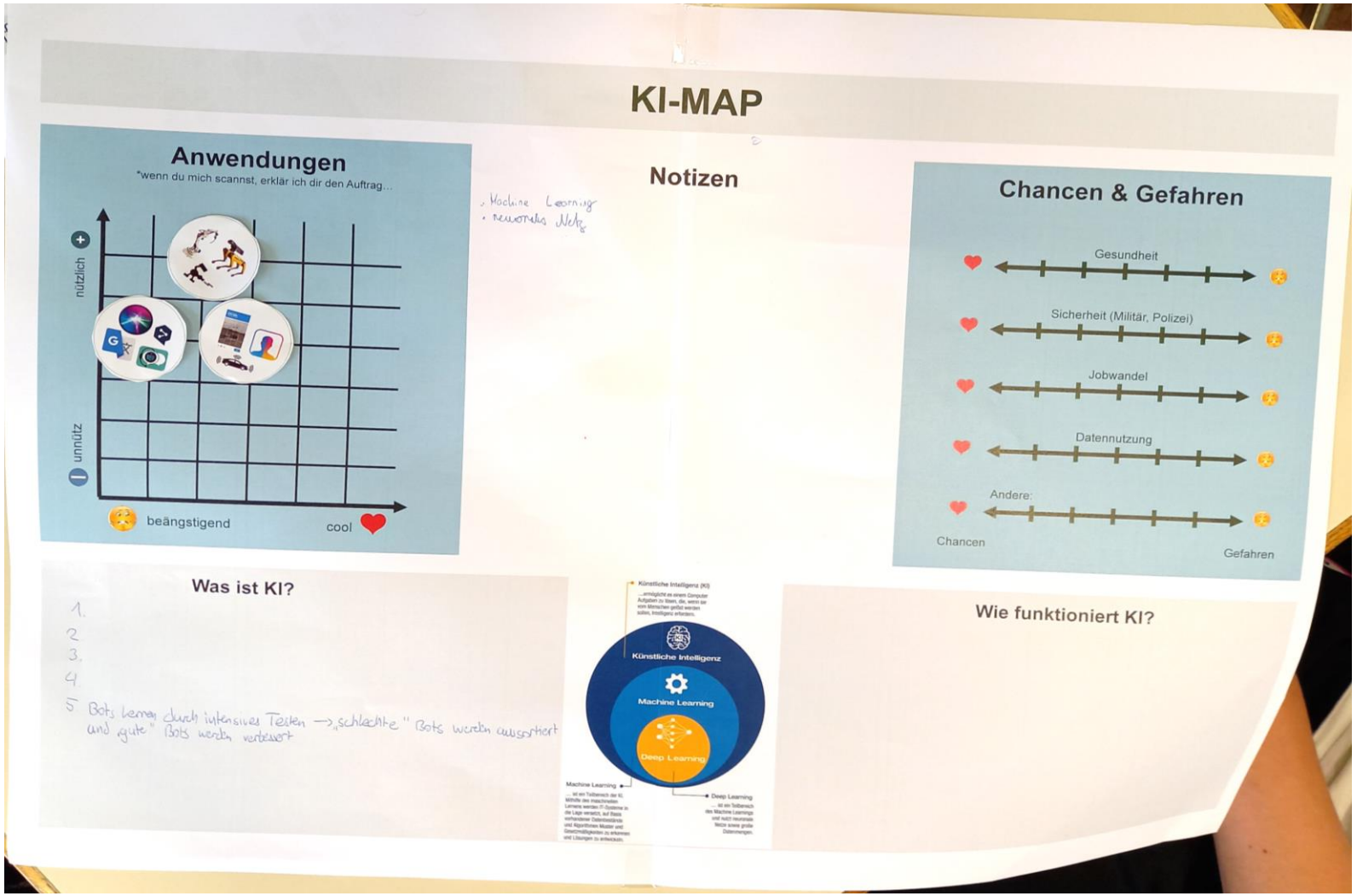
126 Students
8 Classes

Age 17 – 36
Median 17.5

Technical and social tracks

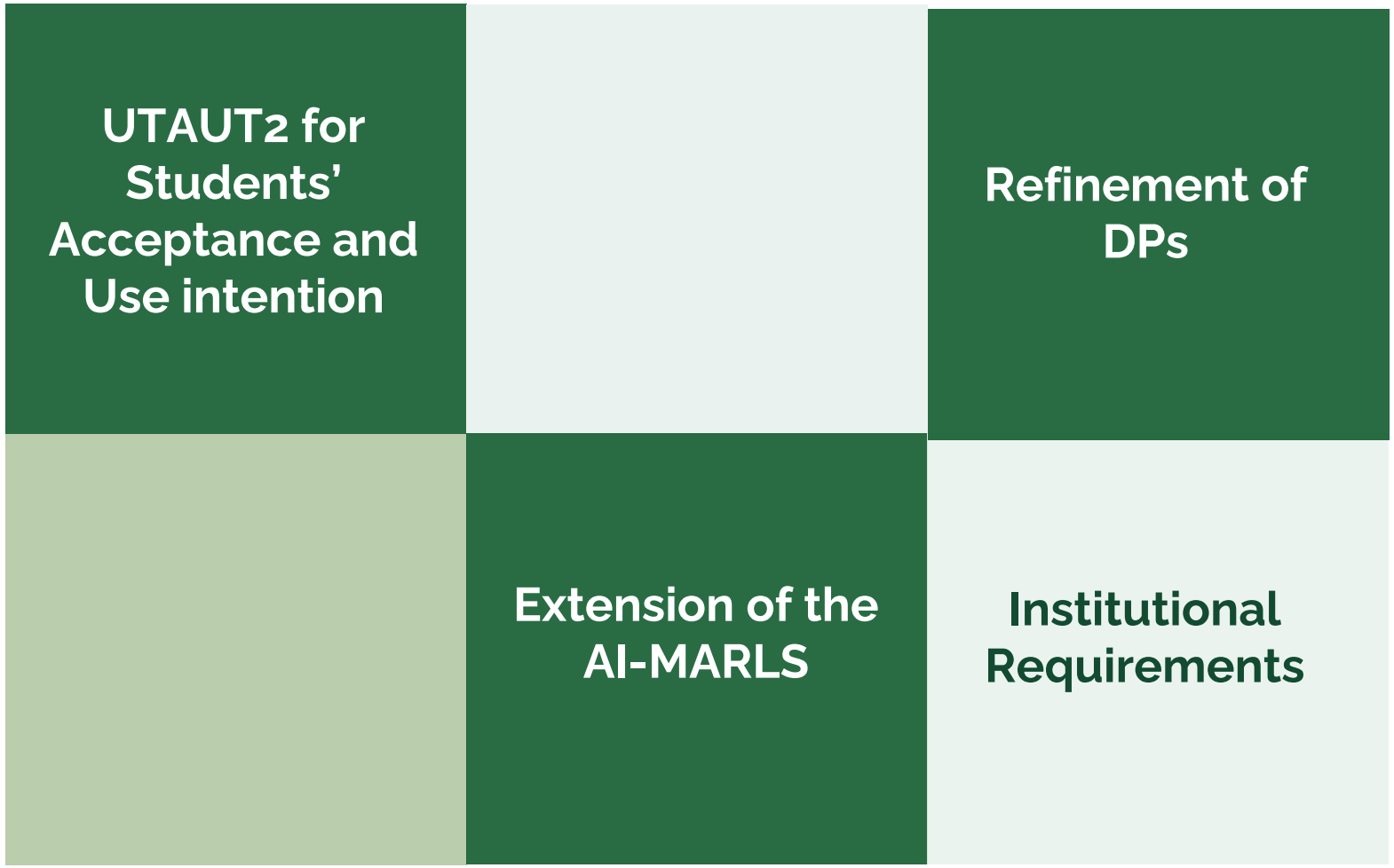


AI-MARLS| The Learning Setting





Further Work and Discussion | MARLS



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